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male was singing nearby, though not so vigorously as usual while in that neighborhood. After chirping quietly near the place, the female fitted away and I saw her no more. I concluded that nest-building was then in progress, and decided to leave the warblers for awhile.

Two weeks later, while at the same place I had seen the female carrying her nest material, I engaged the attention of two warblers, a male and a female. During the hour I spent searching the shrubbery near the place, the two birds manifested much uneasiness, though chirping in their quiet fashion. I am as certain that there was a nest in the neighborhood as anyone can be without ocular demonstration, but I failed to find it, though I searched both among the dead leaves on the ground and every bit of bush within fifty yards of that place as a center. During all this period, from June 20 to nearly the end of July, the males were in song, and were only silenced by the parching heat of the sultry July afternoons. It seems perfectly safe to assume that this warbler nests in Montana in the Flathead region, and further observation will verify the assumption.

Lewistown, Montana.

Summer Birds of the Papago Indian Reservation and of the Santa Rita Mountains, Arizona

BY HARRY S. SWARTH

SOUTH of Tucson, Arizona, along the banks of the Santa Cruz River, lies a region offering the greatest inducements to the ornithologist. The river, running underground for most of its course, rises to the surface at this point, and the bottom lands on either side are covered, miles in extent, with a thick growth of giant mesquite trees, literally giants, for a person accustomed to the scrubby bush that grows everywhere in the desert regions of the southwest, can hardly believe that these fine trees, many of them sixty feet high and over, really belong to the same species. This magnificent grove is included in the Papago Indian reservation, which is the only reason for the trees surviving as long as they have, since elsewhere every mesquite large enough to be used as firewood has been ruthlessly cut down, to grow up again as a straggly bush.

Twice, at about the same season of the year, it has been my good fortune to spend a short time studying the birds of this region. The first time was in 1902, when Mr. O. W. Howard and I spent a week, from May 17 to 23, in the mesquites; while my second visit to the place was in 1903, when Mr. F. Stephens and I explored it pretty thoroughly during the first two weeks in June.

Leaving Tucson on the afternoon of June 3, we had ourselves and outfit driven to a spot about at the edge of the big mesquite forest, some ten miles from town, and less than a mile from the old San Xavier Mission. But little could be done that day beside getting some order in camp, and the first thing the next morning we went to call on Mr. Berger, the Indian agent, to whom we explained our aims and objects. He at once gave us permission to camp as long as we desired, and to make ourselves at home in every way; with the added request, however, that we refrain from shooting around the fields where the Indians were getting in hay. It seemed that some sportsmen (?) from town had on various occasions, in their reckless shooting, peppered the Indians with shot, a procedure to which Lo most unreasonably objected.

The first three days we devoted to exploring the mesquite forest, with most gratifying results. In the early morning the medley of bird songs was absolutely confusing, and the number of individuals of the many species found in this region, was far beyond what is usually the case in the lowlands of Arizona, where, although quite a variety of species may often be found, the conditions are not such as to support an abundance of animal life of any kind.

A little later several days were spent in investigating the secrets hidden in the giant cactuses. Just north of our camp was a steep, circular hill, apparently of volcanic origin, covered with loose, black boulders, and rising abruptly from the fertile valley, like an island from the sea, other similar ones, being irregularly scattered through the valley. Aside from some thin, straggly larrea bushes, and a few small cactuses, the only vegetable growth on the hill was the giant cactus (*Cereus giganteus*), with which huge plants the southern slope was thickly covered, there being none upon the opposite side. In working in the mesquites we were always in the shade, and did not suffer much from the heat, but out on this hill, exposed to the full glare of the Arizona sun, we found it impossible to work except in the early morning and late in the afternoon, being driven to shelter in the middle of the day. It is no joke to carry a twenty-foot ladder about on level ground, from one cactus to another, but on a steep hillside, stumbling over loose boulders, dodging cactus, and with the perspiration running in one's eyes, a person feels that he earns pretty nearly all that he succeeds in getting. The cactuses on this barren, unattractive looking hill were particularly rich in bird life, and one or two species were found that did not seem to occur at all out on the flat, open mesa, though the elf owls were probably more abundant in the latter locality.

On June 11, while miles from camp, Mr. Stephens and I were caught in a thunder shower. I suppose it is right to call it a shower, for it did not last many hours, but then the way in rains in Arizona it does not need to continue many hours before the heavens are emptied. We plodded back, ankle deep in water, along roads where we had kicked up clouds of dust on starting out in the morning; and that night the river rose so, that, had not the banks been worn fifteen or more feet deep by previous similar occurrences, one camp would have probably been washed away, and we would have been obliged to take to the trees.

Two days later we left this place and started for the Santa Rita Mountains. All of one day we drove up the valley of the Santa Cruz, thirty miles or more, then, turning to the left, headed straight to the mountains, which we reached about noon of June 15. Our camp was pitched near the mouth of what appeared to be the best, almost the only, canyon of any size on the west side of the mountains. It was very broad, with widely extending slopes on either side, running up to a low saddle on the divide. The altitude at this point on the divide was 7400 feet, and at our camp 4500 feet. From the saddle, the mountain on the north ran up to a high granite peak, steep and nearly bare of vegetation, to an altitude of nearly 10,000 feet. Below the mountains the canyon continued in the shape of a deep, sharply defined ravine, extending for miles, but turning sharply to the south, so as to run nearly parallel with the range. This ravine was densely wooded with sycamore, oak, mesquite and other trees. The whole of the lower parts of the mountains were thickly covered with live oaks, and in the higher parts there was some, though not a great deal, pine timber. On the west side we found the mountains covered nearly everywhere with thick brush, and, in the higher parts, exceedingly steep and rough, so that it was impossible to travel in comfort anywhere but along the main canyon, and in one or two of its branches. In years gone by there was a great deal of timber taken out of these mountains, and traces

of the old roads used may still be seen in many places, though nearly overgrown with underbrush. At that time there seemed also to be a good deal of mining going on, and there were probably many people living in the mountains. Now they seem almost deserted except for a few wandering prospectors and hunters. In many places we found the remains of old adobe houses, and about three miles below our camp was the site of the old abandoned Fort Buchanan.

Under ordinary circumstances this should have been a place rich in bird life, and indeed Mr. Stephens found it so on a previous visit to the mountains in 1884, when he found several species then new to our fauna. We were much disappointed, however, in the great scarcity, both of birds and small mammals, the cause of which was not hard to surmise, for, for several years past the country had been suffering from a prolonged drought, the marks of which could be plainly seen in the numerous dead trees scattered along the cañons. The last winter, however, had left plenty of snow on the mountains, and the heavy rain storm that occurred just before we reached them started the streams running in good shape, so there was plenty of water in the mountains while we were there; but many species of birds that had been driven away by the dry weather had not yet returned to their old haunts, and others that should have been abundant were very scarce. One effect of the drought was to cause many birds to refrain from breeding altogether; for individuals were taken of many of the species found in the mountains, that had evidently not been breeding, nor showed any intention of doing so.

I have thought it best, the two localities being so entirely different, to make separate lists of the species seen along the Santa Cruz River, and in the Santa Rita Mountains. The first mentioned list is, I think, fairly complete, for I know of hardly any species that might be expected to occur in this region during the summer months that we failed to meet with. During the migrations it is different, for at such times there should be a great variety and number of birds found passing through this region. The river valley runs practically due north and south, and, presenting an abundance of food, water and shelter in a comparatively restricted area, with a barren, practically desert, country on all sides, it forms a natural highway, along which the majority of the birds passing through the region would naturally travel.

The list of the Santa Rita Mountain birds is anything but complete, for we explored but a small part of the range, under very unfavorable circumstances. Many species have been taken that we failed to meet with, and still others, not yet recorded from the range, will probably be found there later. Such notes as were made, however, present some points of interest, and I give the list for what it is worth.

BIRDS SEEN IN THE PAGAGO INDIAN RESERVATION

Ardea v. anthonyi. Anthony Green Heron. Several that were seen along the Santa Cruz River were probably breeding somewhere in the vicinity, though no nests were found.

Nycticorax n. navius. Black-crowned Night Heron. Several seen in the same place as the last.

Callipepla gambeli. Gambel Partridge. Breeds in considerable numbers throughout the mesquite forest. Broods of young were continually being met with, most of the juveniles being about the size of sparrows, though able to fly, and presenting a curious appearance as they buzzed away in all directions through the trees, like overgrown bumble bees or beetles.

Zenaidura macroura. Mourning Dove. Quite abundant, but so overshadowed by the following species as hardly to be noticed.

Melopelia leucoptera. White-winged Dove. The Sonora dove of the natives. By far the most abundant bird in the mesquite forest, and also the most conspicuous and noisy. Though not particularly gregarious, at least not at this time of the year, white-winged doves were to be seen in all parts of the forest though but seldom out on the mesa; and while rarely out of sight, they were never out of hearing. The coo of this bird has been aptly compared to the sounds produced by a young cockerel just beginning to crow, and while this conveys some idea of the gasping, choking, disconnected nature of the outcry, no description can do justice to the effect produced by the united effort of thousands at once. They were not quite so noisy toward noon, during the heat of the day, but the noise they made morning and evening was such as to almost entirely drown the notes of the other birds; after a little the continual rumble they made, forming, as it were, a sort of back ground to the other sounds, was hardly noticed by us, except when some performers started to tune up near at hand. Judging from the individuals I watched, it seemed to call for considerable physical exertion for them to discharge themselves of the music with which their souls were burdened.

A good many nests of this species were found, but nothing in proportion to the number of birds seen, and I am quite sure that the bulk of them were not breeding at this time. Many specimens of both sexes were taken that certainly were not. The nests were usually built rather low down, from five to twenty feet above the ground, generally below fifteen feet; and apparently with no attempt at concealment. When the female was flushed from the nest she usually fluttered away, simulating a broken wing, as the mourning dove does. Unfinished nests were found, and others containing young nearly ready to fly. Male birds, presumably, were occasionally seen circling about with wings and tail rigidly outspread, as the band-tailed pigeon does in the breeding season; but I never heard them make any such peculiar noise as the larger bird does at such times.

Columbigallina p. pallescens. Mexican Ground Dove. Fairly abundant about the cultivated fields and in the pastures, and also in the more open places in the mesquites. None were seen in the thicker parts of the forest. The curious note so out of proportion to the size of the bird was occasionally heard, but not often, as they had not yet commenced to breed. They were usually found in small bunches of four or five, often whirring up from the grass or weeds in nearly as startling a manner as so many quail. It is rather singular that while quite a good many of the Inca dove (*Scardafella inca*) were seen about the streets of Tucson, and in corrals and gardens, not a single one was met with anywhere outside of the town.

Cathartes aura. Turkey Vulture. Seen flying about overhead occasionally.

Accipiter cooperi. Cooper Hawk. In May, 1902, Mr. O. W. Howard and myself secured two sets of eggs of this species in this region. On my second visit to the mesquites none of the birds were seen, though there were probably some about for all that.

Parabuteo u. harrisi. Harris Hawk. On May 23, 1902 I vainly pursued an individual of this species that lit on a tree near our camp. It was the only one I saw in this region.

Buteo b. calurus. Western Red-tail. One or two seen. A few nests of this species were seen on limbs of the giant cactuses on the mesa, but I think they are far more abundant along the base of the Santa Catalina Mountains, on the other side of the valley.

Buteo swainsoni. Swainson Hawk. One or two seen along the Santa

Cruz River, probably after lizards or frogs. They breed out on the open mesa, but do not seem to do so in the thick woods.

Asturina plagiata. Mexican Goshawk. On June 4 a set of three, and on June 11 one of two eggs were secured. In the third week in May, 1902, Mr. Howard and I secured five sets of three eggs each in this same place. All the nests found were in the largest mesquites, built from forty to fifty feet from the ground, one that we measured being just forty-seven feet. Five of the birds were secured; the stomach of one contained some very young doves, apparently taken from the nest, another contained the remains of a quail, and the others held some large lizards. Those secured were all alike in the ordinary adult plumage, but two others were seen, possibly birds of the previous year, with longitudinal instead of transverse markings on the lower parts; and the female from which the set of two eggs was taken, was of a brownish coloration, so much darker than the others that at the first glance we were uncertain whether or not she was a Cooper hawk. They were rather noisy birds and could often be heard screaming as they flew about over the tree tops.

Falco s. phalæna. Desert Sparrow Hawk. Common; breeding in giant cactus. In one hole young about ten days old were found, which, with claws and lungs, vigorously entered their protest at being handled.

Polyborus cheriway. Audubon Caracara. Though not observed on the reservation, while we were returning from the Santa Ritas, on June 28, a single individual of this species was seen near the Santa Cruz River, feeding on some carrion in company with a number of turkey buzzards.

Megascops a. cineraceus. Mexican Screech Owl. A single specimen was secured by Mr. Stephens, though others were heard hooting every evening. They breed in the giant cactus.

Bubo v. pallescens. Western Horned Owl. Two were seen in the mesquites, but not secured.

Micropallas whitneyi. Elf Owl. This interesting little owl is so entirely restricted to the giant cactus, in the cool depths of which he finds a comfortable summer home when everything outside is fairly sizzling with the heat, that in the breeding season, at least, it is almost useless to seek for them elsewhere. I have seen an odd bird or two in other places, and was with Mr. Howard when he secured a set of eggs from a hole in a mesquite tree, but such individuals are but the merest stragglers from the hundreds that occupy the cactuses on the surrounding mesa. Mr. Stephens and I were too late for them and secured but a single set of eggs, but a great many young of all ages were found in the holes examined.

The elf owl seems to be strictly nocturnal, and, when turned loose in the glaring sunlight, they were singularly helpless, in striking contrast to the little pigmy owl, which, in general appearance, they resemble so much. Judging from an examination of the contents of the stomachs of about twenty of the birds, I should say that they were entirely insectivorous in their diet, as nothing but the remains of beetles and other insects were found.

Geococcyx californianus. Roadrunner. A few were seen in the mesquites.

Coccyzus a. occidentalis. California Cuckoo. This species was more common in the mesquite forest than I have ever seen it anywhere else. As usual the birds were hard to see in the shrubbery, though we occasionally caught sight of them crossing from one side of the river to the other; but their peculiar notes could be heard everywhere we went, and sometimes around the camp three or four could be heard calling at once. Some of the females secured had evidently laid part of their sets, but we were unable to find any nests.

Dryobates s. bairdi. Texan Woodpecker. Quite common in the big mesquites.

Centurus uropygialis. Gila Woodpecker. The curious querulous note of this woodpecker could be heard everywhere in the mesquite forest, and many were found breeding in the giant cactus as well. Several nests full of half grown young were found in the latter locality.

Colaptes c. collaris. Red-shafted Flicker. A very few individuals of this species were seen in the big mesquites.

Colaptes chrysoides. Gilded Flicker. This is another species that appears to be restricted entirely to the giant cactus during the breeding season; a very few were seen in the mesquites, but not many, and no nests were found in that locality.

The unfortunate flickers seem to have a big contract forced upon their hands, for they undoubtedly furnish most of the nesting sites occupied by the many species that have come to look upon the big cactus as their natural summer home. The Gila woodpeckers do some of the work, no doubt, but they breed in other trees more than in the cactus, and on the flickers fall most of the labor, needed to supply the sparrow hawks, owls, flycatchers, and others, with safe retreats. Of course the work is not as hard as chopping into hard mesquite or oak trees, but still if the cactus is as yielding, and yet clinging to their bill, as it is to the collector's hatchet, they are by no means to be envied their job.

It is rather curious that, breeding close together, as *C. chrysoides* and *C. c. collaris* do in southern Arizona, more hybrids between the two are not found. I have seen but one. This bird, a male taken at Tucson, appears to be a true hybrid between the two species. It is about the size of *chrysoides*, and in general coloration is darker than that species, but appreciably paler than *collaris*. There are no bright yellow feathers in either tail or wings, but in all the quills the red has a very washed out appearance, being much paler, more of a brick red, than is ever the case with *collaris*. In southern California, birds with more or less yellow in wings and tail are of fairly common occurrence, but I think that in all such cases it is due to intermixture with *C. a. luteus*, as indeed is shown in most cases by more or less distinct traces of the red nuchal crescent, of which there is no sign in the bird mentioned above.

In the mountain regions of Arizona, where *collaris* breeds quite commonly, I have never seen *chrysoides*, nor do I know of any instance of the former species breeding in the giant cactus. As noted above, I saw a few red-shafted flickers in the mesquites along the Santa Cruz river, where they were probably breeding; and it seems strange that we should find the two species breeding almost side by side, practically without mixing, when we consider the extensive hybridization that takes place in the northwest, where *collaris* and *luteus* come together.

Phalænoptilus nuttalli. Poor-will. Frequently heard calling in the evenings, usually on the rocky, cactus-covered hill near the camp.

Chordeiles a. texensis. Texan Nighthawk. Very abundant, though not seen in the thick woods. They undoubtedly bred in the vicinity, but though many were flushed from the ground, no eggs were found.

Aeronautes melanoleucus. White-throated Swift. Occasionally seen flying overhead, having probably strayed down from the Santa Catalina Mountains.

Trochilus alexandri. Black-chinned Hummingbird. A few were seen along the Santa Cruz River, no other species of hummingbird being observed anywhere in the vicinity.

Tyrannus verticalis. Arkansas kingbird. Breeds around the edges of the mesquites and in the cottonwoods around the cultivated fields. I thought I saw *vociferans*, as well, once or twice, but could not make sure.

Myiarchus m. magister. Arizona Crested Flycatcher. On the cactus covered hill north of our camp we found this species breeding quite abundantly, though none were seen out on the flat mesa; and had we remained in our camp in the mesquites, scarcely five hundred yards distant from the hill, I doubt if we would have known there were any of the birds around, so closely did they stick to their barren hillside. The birds were exceedingly noisy and quarrelsome, but very wary and hard to get a shot at, sitting at a safe distance when their nest was robbed, and uttering continually their loud, harsh call. Some eight or ten nests were examined, all very much alike. The cavities were all from fifteen to twenty-five feet from the ground, and I doubt that we found any nests more than half way up the hill. Most of the species occupying the cactuses were found nearer the base than the summit of the hill. The nests were all very much alike, being composed mainly of hair taken from dead horses and cattle, and smelling vilely. Usually there were pieces of snake skin in the nests, and occasionally a mummified owl or woodpecker underneath. The number of eggs in a set ranged from three to five.

Myiarchus cinerascens. Ash-throated Flycatcher. Breeds fairly abundantly in the mesquites. I have also found it nesting in the giant cactus, but not in any numbers.

Empidonax trailli. Traill Flycatcher. Seen and heard in the mesquites along the river.

Pyrocephalus r. mexicanus. Vermilion Flycatcher. A common and conspicuous species, breeding everywhere in the mesquites.

(*To be concluded.*)

A New Code of Nomenclature

DURING the latter part of the fall semester of 1904, President Jordan of Stanford University delivered a series of lectures on nomenclature before the faculty and graduate students of the biological departments. After an introductory talk on the history of nomenclature, he devoted the remaining lectures to a discussion of the principles and canons of the A. O. U. Code. On several important points Dr. Jordan took issue with these. It is fortunate for students in general that Dr. Jordan's wide practical experience with knotty problems in nomenclature is to be embodied in a new code, which will shortly appear under the joint authorship of Doctors Jordan, Evermann, and Gilbert. Dr. Jordan has kindly allowed me to make extracts from the manuscript, in advance of the regular publication.

There are thirty canons in the new code, several of the A. O. U. canons having in many cases been condensed into one. These are followed at the end by short notes. Most of the canons of the A. O. U. code are now very generally accepted and need no explanation. I have made extracts only where the new code differs materially from that of the A. O. U. The paper is entitled "NOMENCLATURE IN ICHTHYOLOGY. A PROVISIONAL CODE BASED ON THE CODE OF THE AMERICAN ORNITHOLOGISTS' UNION."

"The recent preparation of numerous papers in systematic ichthyology has necessitated the reconsideration of many problems of zoological nomenclature, and as some of these are not covered by any canon in any recognized code, and again, as certain canons in the best considered of the various codes of nomenclature, that of the American Ornithologists' Union, are not available in the study of fishes, we have ventured to draw up a code for our own use in ichthyology.

"The value of a code depends not on the authority behind it, but solely on its simplicity, usefulness, and naturalness. Formal agreements among groups of authors are always marked by compromises in which fitness and exactness are more or less sacrificed in the interest of unanimity of action. These compromises one and all are discarded in the progress of science.

"The present statement represents therefore solely the present practice of the present authors. No one else is bound by it, and they will not be bound in the future in any case in which they find reason to believe that their present views are faulty.

"The different canons in this code are based on those composing the code of the American